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C L A I M S

- 5 1. An expander system for radially expanding a tubular element having an unexpanded portion of a first inner diameter, the expander system including an expander movable between a radially retracted mode and a radially expanded mode, wherein the expander includes an expansion surface extending in axial direction of the expander, the expansion surface being operable to expand the tubular element from said first inner diameter to a second inner diameter larger than the first inner diameter by movement of the expander from the retracted mode to the expanded mode thereof, said expansion surface being of increasing diameter in axial direction of the expander.
- 10 2. The expansion system of claim 1, wherein the expander comprises a contact surface for contacting the inner surface of the tubular element, said contact surface being of a diameter larger than said first inner diameter when the expander is in the radially retracted mode thereof.
- 15 3. The expander system of claim 2, wherein said contact surface has a smallest diameter smaller than said first inner diameter, and a largest diameter larger than said first inner diameter.
- 20 4. The expansion system of claim 2 or 3, wherein said contact surface forms at least part of the expansion surface.
- 25 5. The expander system of any one of claims 1-4, wherein the expansion surface is of continuously increasing diameter in axial direction of the expander.

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6. The expander system of claim 5, wherein the expansion surface is a tapering surface.
7. The expander system of claim 6, wherein the expansion surface has a frustoconical shape.
- 5 8. The expander system of any one of claims 1-7, wherein said expansion surface is arranged to move radially outward in substantially uniform manner along the length of the expansion surface upon movement of the expander from the retracted mode to the expanded mode thereof.
- 10 9. The expander system of any one of claims 1-8, wherein the expander comprises an expander body including a plurality of body segments spaced along the circumference of the expander body, each segment extending in longitudinal direction of the expander and being movable between a radially retracted position and a radially expanded position.
- 15 10. The expander system of claim 9, wherein the expander body is provided with a plurality of longitudinal slots spaced along the circumference of the expander body, each said slot extending between a pair of adjacent body segments.
- 20 11. The expander system of claim 9 or 10, wherein each body segment is at both ends thereof integrally formed with the expander body.
- 25 12. The expander system of any one of claims 9-11, wherein the expander body is a tubular expander body, and wherein the expander includes an inflatable fluid chamber arranged within the tubular expander body so as to move each body segment radially outward upon inflation of the fluid chamber.
- 30 13. The expander system of claim 12, wherein said fluid chamber is formed within an inflatable bladder arranged within the tubular body.

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14. The expander system of claim 12 or 13, further including a fluid flow control system for controlling inflow of fluid into the fluid chamber and / or outflow of fluid from the fluid chamber.
- 5 15. The expander system of claim 14, wherein the fluid flow control system is arranged to control said fluid inflow and said fluid outflow in alternating mode.
16. The expander system of claim 14 or 15, wherein the fluid control system includes a valve for controlling outflow of fluid from the inflatable fluid chamber.
- 10 17. The expander system of claim 16, wherein the valve is provided with electric control means arranged to control the valve.
18. The expander system of claim 17, wherein the electric control means comprises an electric conductor extending through a conduit for the transfer of fluid to or from the inflatable fluid chamber.
- 15 19. The expander system of any one of claims 1-18, wherein the tubular element extends into a borehole formed in an earth formation, and wherein the expander is arranged within the tubular element.
- 20 20. A method of radially expanding a tubular element using the expander system of any one of claims 1-19, comprising the steps of:
  - 25 a) arranging the expander within the tubular element;
  - b) moving the expander from the retracted mode to the expanded mode thereof so as to expand the tubular element;
  - c) moving the expander from the expanded mode to the retracted mode thereof;
  - 30 d) allowing the expander to move a selected distance through the tubular element by the action of an axial force exerted to the expander, said selected distance

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being smaller than the length of the expansion surface in axial direction of the expander; and

e) repeating steps b)-d) until the expander has expanded the tubular element or a desired portion thereof, from the first diameter to the second diameter.

5 21. The expander system substantially as described hereinbefore with reference to the drawings.

22. The method substantially as described hereinbefore with reference to the drawings.